

TRANSLATION

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Patent Application

Device for Physical Exercise,

Especially for Physiotherapy

The invention concerns a device for playing, training and therapy, in particular an orthopedic-gymnastic device.

It consists in its basic principle of a freely rotating tumble disc with an essentially plane tread surface, a central protruding pivot which constitutes the fixed point, and a running ring.

Its purpose is the general workout of the body, muscles, tendons and joints and allows favoring certain body parts or locations.

Preferred areas of application are training therapy of foot and posture deficiencies, static irregularities of juveniles, varicose veins with leg congestions, cramps in the calf, chronic cold feet, limitations of joint movements either due to age, after fractures, through traumatic fixation or similar.

It prevents damage due to an unbalanced life style such as sedentary activity, driving of automobiles, and overall lack of movement and things of that nature.

It strengthens the musculature and tendons of legs, the pelvis and the back.

It loosens and promotes circulation in the feet, knees, hips, the sacrum, joints of the spinal column and thus has a beneficial influence on circulation in general and of the lower limbs and the lower abdomen in particular.

It promotes the equilibrium of the body and a springy gait, improves the length of steps and step performance and may be considered as a general training device for various sports.

Since it occupies little space, it is also suitable for group gymnastics in schools, associations and for orthopedic gymnastics, where each individual's performance can be accounted for through the various scaling of the tipping heights.

In physiotherapy it can be used in many ways with simple attachments and thanks to its simplicity and easy use it can be made available to patients for exercising at home with precise training instructions. In this way the success rate with often lengthy treatments, as for instance of scoliosis, hip arthrosis etc. can be greatly improved because the patient is now able to exercise regularly and the device can easily be taken along on vacation for instance.

Application of the device is extremely simple. The user steps with both feet firmly on the tread area and by shifting his body's center of gravity he makes the tumbling disc roll along in one or the other direction of rotation. Either both knees may be bent, or one knee may be kept straight and the other one bent or both knees may be maintained in the straight position, with the upper body remaining more or less upright and the arms may be used to assist in the movement.

The position of the feet on the tread is also variable; depending on the desired effect the feet may be placed either parallel side by side, or with the toes pointing outward or inward and this may be done either in the middle or also moved to one side and/or to the front or the back.

A further possibility of variation exists by altering the lateral distance between the feet which may be further increased by attaching an extension board to the tread area. A wide straddle position results, among other things, in an increased exercise of the hip joint and of the hip joint muscles.

Not only for the sake of secure steadiness and other benefits to be explained later on the one hand, but also for the reproducibility of a certain foot position, it is useful to provide the tread area with a rim that is slightly bent upward and with tread or support markings for the extension board.

An especially important possibility of variation exists because the fixed point can be adjusted in its height relative to the running ring, for instance by means of interchangeable pivots, through shifting the thread of the pivot itself and/or of a pivot support area, through threaded pivot adapters or a height-adjustable running ring support area. Here it is also possible to give the running ring a round or oval shape and/or to give it different heights over its circumference. In the latter cases the presence of tread markings is particularly important, because each torsion of the body axis in relation to an axis of symmetry of the tumbling disc changes the load on certain groups of muscles and on joints and such.

A particularly simple form of the device is achieved because the running ring is of one piece with the tumbling disc and has been worked from solid material.

But on the other hand it is also possible to form the running ring as a closed ring tube as part of a frame construction which supports the tread area and the pivot. In this case the type of construction depends in large measure on the material used or its mechanical properties respectively.

A particularly useful possibility of equipment and an extension of the areas of application is achieved by the use of a movable running disc as support for the tumbling disc with means to limit the drift of the fixed point, for instance by a running trough with a limiting boss, a flexible and rotating connection between pivot and running disc or a rigid bolt respectively which can enter into an opening of the pivot. This results first of all in saving the floors of closed rooms so that the device may for instance be set up on carpets, or outside in becoming independent of the type of ground surface and thus an even and smooth operation of the tumbling disc.

But in addition hereto this makes it possible to use means for the unilateral or universal height adjustment of the support disc such as telescopic feet with thread or rack gear, inclinable support braces with punched-hole adjustable center of pressure, or support shims that can be positioned in various positions etc. As a result of the variable inclination of the running disc obtained in this manner, additional possibilities of affecting certain muscle and joint groups that are to be selected discreetly.

The simple variation of the height enables the physician or the trainer to observe the user more closely and to determine the correct position or type of movement or to make appropriate corrections.

This purpose is also served by a dial division of the running disc (not the tumbling disc), thus permitting – with the board in an inclined position - to limit the exercise to a defined sector and thus to a specific exercise of the body.

In certain cases it is recommended to provide for the placement of height-adjustable means of support for the center axis of the support disc which remains horizontal. In this manner it is possible to keep the support disc sufficiently rigid and vibration-free with minimal weight.

It is possible in all cases to make the device and its accessories portable, for instance by providing a handle on the tumbling disc itself or if necessary on the supporting disc. If here interchangeable pivots are used for adjusting the height of the fixed point, it is useful to provide mounting openings on the underside for the pivots of various heights, whereas the fastening can be made in many different ways, for instance through threading. But is especially useful to provide holding straps, for instance of stretch-elastic material which can be attached with simple clamps over the bent-up rim of the tread area.

Using a number of accessories is also possible and in certain cases appropriate, such as for instance a gallows-shaped holdfast with a strap or for attaching a Glisson head-sling or Glisson chest-sling respectively which can be suspended rigidly by means of a pulley block or elastically by using a rubber strap or a spring mechanism.

Another possibility exists in the use of a frame of parallel bars or for instance also of circular bars.

The object matter of the invention and some of its possibilities of application are described in more detail by a number of design examples which are shown schematically in the attached drawings.

Fig. 1: A view of the basic device with various components seen from below and in the dot-dash-line a possible variation;

Fig. 2: A vertical section through the device in accordance with fig. 1 with another possible variation shown in a broken line;

Fig. 3: A vertical section through another design form of the basic device;

Fig. 4: The top view that goes with figure 3;

Fig. 5: A vertical section through yet another design of the basic device;

Fig. 6 - to 8: different possibilities for modifying the height of the fixed point in vertical sections;

Fig. 9 - 11: partially broken off vertical sections through the basic device with support disc and drift limitation;

Fig. 12: a preferably stationary device in a top view with height adjustability and inclinability of the running area;

Fig. 12a: a vertical section of this, seen from the right;

Fig. 12b and 12c are variants of this, shown also in vertical sections;

Fig. 13: another design of the device with the supporting disc in a vertical section with the fixed point remaining at the same height, while the running surface for the running ring is height-adjustable and possibly also inclinable;

Fig. 14 – 17 show in a simple schematic view or section view respectively various design possibilities for inclinable running discs and

Fig. 18: a vertical section of the device with supporting disc, packed up for transportation;

Fig. 19 – 21 show in schematic line drawings the possible applications of various auxiliary devices and accessories.

As per figures 1 and 2 the tumbling disc 1 consists essentially of one piece which can be worked for instance out of solid wood, or molded from thermoplastic or pressed from duroplastic synthetic material.

The tread area 2 may be either completely plane or shaped slightly conically with a bent-up rim. The fixed point 3, around which the disc is allowed to tumble, is formed by a pivot 4 which in its simplest form has also been worked from the material of the tumbling disc, i.e., is one part with the latter. The design shown uses interchangeable hollow pivots 4a – 4d which may be inserted for shipping purposes in special recesses on the underside of the tumbling disc, whereas for actual operation a central recess 10 is used for insertion of the selected pivot. In this example of the design the running rim or the running ring 5 respectively is also of one piece with the tumbling disc body; in the normal version (unbroken and shaded) the running ring 5 is round and of the same height over the entire circumference. The broken line in figure 2 suggests that the running ring may also have a different height over the circumference, so that an uneven tumble movement is produced which results for instance in less inclination of the disc on one side than on the other side. Another possibility is suggested in figure one by the dot-dash-line: here the running ring 5b may have a somewhat oval shape so that during one rotation of the tumbling disc the inclination will twice be more pronounced and twice more reduced. Depending on the user's position on the tread board, different effects can be achieved.

The device is shown in these figures in its portable configuration with several hollow pivots which are inserted into the holding rings or recesses and which are anchored to the disc with straps 6 that are hooked into the bent-up rim of the tread area 2 with hooks 7. An extension board 8 may be fastened temporarily to the tread area 2 in any desirable manner in order to enlarge the tread area and thus allowing for even wider straddle positions by the user. And there is a carrying handle 9.

The device as per figures 3 and 4 consists in its basic design of a frame construction 11 to which by means of adjustable steering arms 13 a running body 14 which corresponds to pivot 4 has been attached in a height-adjustable manner, whereas the tread area 2 may consist of a central circular disc 12 and circular rings 12a and 12b. The junctures between the individual parts of the tread area 2 may simultaneously serve as tread markings. Additional tread markings may be inlaid or painted on or produced otherwise in any permanent manner. The running ring itself may consist, as accentuated in figure 5, of a ring tube.

The design as shown in figure 5 also uses a frame 11 for fixing the circular tube 15

which serves as the running ring and forms a holding pivot 16 for the running pivot 4 which may also be interchangeable or height-adjustable through a threaded mechanism. In this case the tread area 2 connected to frame 11 is of one piece and flat. Also shown is the extension board 8, but without indicating any of the numerous possibilities of fastening it to the tread area 2.

Figure 6 shows a variation of the design shown in figures 1 and 2 with a central pivot 16 similar to figure 5 onto which hollow pivots 4 of different heights can be placed in order to modify the location of the fixed point.

Figure 7 shows a threaded running pivot 17 that completely passes through the tumbling disc 1, and figure 8 shows a threaded piece 18 onto which one or more intermediary pieces 19 and a closing piece 20 can be screwed and which together form the running pivot 4. If the closing piece 20 is screwed directly onto the threaded pivot 18, one obtains the lowest height of the fixed point 3. It is also possible to obtain infinitely variable height adjustment by means of a running pivot which consists of two parts that can be screwed into each other.

Figure 9 shows how the basic device is completed by a running disc 21 as support with

small feet or baseboards 22. To ensure that the tumbling disc 1 always remains on the running disc and that it cannot slip off on one side, a drift limit has been provided for the fixed point or the pivot 4 respectively, in the form of a recess 23 with an annular ring 24. Instead of this or also in addition hereto a flexible connection by a chain 25, a traction cable or similar may be provided. For this purpose the pivot 4 and the running disc 21 each have a taper hole in the area of recess 23 and behind which the connecting piece 25 may be fastened with a cotter pin or something similar.

Figure 10 shows a similar fastening on a smooth running disc 21. The chain is again numbered 25 and the cotter pin 27. The pivot that can be inserted into the recess 10 of the tumbling disc 1 is here ring-shaped and has on its top side a cross bar or a closing lid 29 from which the chain 25 is suspended. The pivot shape 28 can essentially also be used on other designs; the only difference in comparison to the pivot 4 which is closed on the bottom - is that there is no longer a single fixed point 3 but instead of that there is now a running circle which replaces the fixed point.

Another design variation is shown in figure 11 where the drift limit consists of a rigid pivot 31 that

is rigidly connected to the top side of the running disc 21 – by a screw for instance - and which reaches into a funnel-shaped opening 34 of the pivot 4. In this example of the design the pivot 31 is placed in a recess 30 of the running disc 21 and shaped as a threaded stem which bears a supporting disc 32 that is vertically adjustable by rotating the threaded stem 31. In this way there is no need for using a number of running pivots for height adjustment nor for threaded pivots as per figure 7 or 8. In order to protect the edges of opening 34 a screw sleeve 33 is also provided which has the additional function of fixing – similar to a jam nut - the threaded and height-adjustable supporting disc at the desired height. In this case, too, the running pivot 4 is loosely inserted into a recess 10, but this is solely for reasons of processing technology. As a matter of principle it is also possible to realize the pivot 4 in one piece with the tumbling disc 1, but in that case the creation of the cavity in pivot 4 is somewhat more difficult.

As per figures 12 and 12a the running disc 21 is height-adjustable on both sides on a sub-frame so that it can not only be raised or lowered but also inclined laterally. For this purpose the sub-frame consists of hollow feet 35 with a cross member 42 which may be

formed by a board or a frame. The running disc 21 is equipped with telescopic feet which can be raised or lowered in the hollow feet 35 by lead-screw or toothed spindles 36 with a crank handle 37. As a support for the central axis of the running disc 21 around which it can be swiveled, tubular support connection pieces are provided whose cross section may also be of any other shape and which may also be in the form of a one-piece support over the entire width. With a vertically offset pivot or foot section they reach into a stay tube 40 that is fastened on the frame or board 42 and in which the holding device is guided by a setscrew which allows it to be clamped tight while remaining height-adjustable.

As shown in figure 12b, instead of the telescopic feet 38 there may be threaded spindles 44 with a handle 45 which are height-adjustable inside a corresponding threaded pipe 43. The pipes 43 are fastened to the frame or crossboard 42 in the same manner as tube 40. The central support may be the same as the one shown in figures 12 and 12a.

Figure 12c shows a variant with a slightly simplified central support of the running disc 21 on the sub-frame 35, 42. For this purpose the bottom of the running disc 21 and the topside of the sub-frame 35, 42 are equipped with support blocks 47 to which slightly flexible cross bars 46 are hinged.

Attachment screws 48, 49 serve to fasten the crossing members 46 which are longitudinally displaceable and tilting at one end.

Another design variation is shown in figure 13. The running disc is here numbered as item 51 and has a central opening 52 through which extends the running pivot 4 of the tumbling disc 1, resting on a support block 53 and where it may be held by a suitable drift limiter such as pivot 31. For adjusting the height and the inclination of the running disc 51 the lead-screw spindle 36 which can be turned with the crank 37 is equipped with movable nut elements 54 which are preferably movable in reverse, i.e., the spindle 36 must have counteracting threading to both sides. Carrying handles 55 are hinged to the nut elements 54. By turning the crank 37 the nut elements 54 can be moved from the shown position towards the inside so that the running disc 51 will be lowered on this side. In this way it is not only possible to produce any height differentials between the fulcrum of pivot 4 and the running disc 51 on which the running ring 5 is now running alone, but to generate also any inclined positions. The sub-frame 35, 42 is the same as in the preceding figures.

Devices as shown in figures 12 – 13 are primarily intended for institutions, physicians' offices etc. However, in many cases it is

also desirable to use portable equipment with an inclinable running disc. Figure 14 shows a schematic side view of such a construction with a simplified and lower sub-frame 35, 42. The running disc 21 in this case does also have a central pivot 31, and has been fastened to the sub-frame on one side by a piano hinge, whereas the other side is being supported by a support strut 56 which has a swivel fastener at the base 35 and which can be attached – using a cotter pin or similar – at multiple holes 57 at the disc 21. In this way various inclination angles of the running disc 21 are obtained; on the other hand, such fastener holes for optional use could also be provided on the support struts 56.

Another very simple way to achieve an inclined position of the running disc 21 is shown in figure 15. In this case wedges 58 are pushed underneath either over the entire length of the edge to be raised or only on its ends. Height adjustability results from the fact that the running disc 21 can be connected to the wedges 58 with studs in different drill holes. The degree of inclination depends on how far the wedges are pushed underneath.

Another possibility is shown in figure 16 which represents a variation of the design shown in figure 14. Instead of the adjustable support strut with the insertion holes

a threaded strut 50 is provided here which is fastened to the sub-frame by a nut element 60; the strut can be adjusted in its rotation and height. The connection with the disc 21 can be made by simple insertion of the spindle end as it extends beyond a check disc or in any other suitable manner. The hinge is here identified by the number 61.

As shown in figure 17 a particularly simple height adjustment without a sub-frame is obtained when the running disc 21 is equipped on one end with non-slip feet or with a baseboard 62, whereas a thread bolt 63 with jam nut washers 64 is provided at the other end. By counter rotation of the two washers 64 similar to counter nuts the bolt 63 can be set at any desired height. Such bolts are of course placed at a minimum of two corners of a disc edge in order to achieve proper stability. It is also very useful if the bolt head pointing towards the floor is of a non-slip shape or covered with non-slip coating.

Figure 18 is a schematic representation of the portable assembly. The tumbling disc itself and the studs 4 match essentially the previously shown design forms. Only for the acceptance of stud 31 a corresponding recess is provided in the tread area 2. The running disc 21 as well as the disc 42 which belongs to the sub-frame

are shown without the associated means of adjustment and also without the feet 35 which are actually unnecessary under certain conditions. Also not shown are the holding straps for running pivots 4 and the carrying handles, as their design is self-evident and is also subject to numerous possibilities of variation.

Finally, figures 19 – 21 show in very schematic form different application possibilities of accessories. In figure 19 a gallows is suggested by broken lines to which a strap is attached that may be grasped by the user with one or both hands. The broken line suggests that the strap does not have to be placed vertically above the fixed point 3 but that it may also be placed further to the side.

Figure 20 shows, also in pure schematic style, the use of the tumbling disc together with round (oval) parallel bars where the user may place his hands for support. The height of the parallel bars is preferably adjustable; likewise the upper ring may be adjustable so as to achieve different spreads of the arms and thus of the support points for the hands.

Finally, figure 21 shows a gallows with a Glisson sling where the user is suspended by his head,

and this either in a rigid way with a pulley block or with an elastic spring. A Glisson chest sling may be used in the same fashion.

The application and construction examples shown are by no means exhaustive, but they show the numerous possibilities of application and configuration of the object matter of the invention.

Patent Claims

Patent Claims

1. A device for playing, training and therapy, in particular an orthopedic-gymnastic device, characterized by a freely rotating tumbling disc (1) with an essentially plane tread area (2), a protruding central stud (4) which forms the fixed point (3), and a running ring (5).
2. Device in accordance with claim 1, characterized by an extension board (8) to be attached to the tread area (2).
3. Device in accordance with claim 1 or 2, characterized by the fact that the tread area (2) may have a slightly bent-up rim and may be provided with tread or position markings for the extension board (8).
4. Device in accordance with claims 1 to 3, characterized by the fact that the fixed point (3) is height-adjustable in relation to the running ring (5), for instance by means of interchangeable pivots (4a – 4d), by thread movement (17) of the pivot itself and/or of a pivot support plane (32), threaded pivot connectors (19) or a height-adjustable running ring support plane (51).

5. Device in accordance with claims 1 to 4, characterized by the fact that the running ring (5) may be round, oval and/or of different height over its circumference.
6. Device in accordance with claims 1 and the following, characterized by the fact that the running ring (5) is of one piece with the tumbling disc (1) and has been worked from the solid material.
7. Device in accordance with claims 1 and the following, characterized by the fact that the running ring (5) is formed as a closed circular tube (15) and may be part of a frame construction (11) which bears the tread area (2) and the pivot (4 or 14 respectively).
8. Device in accordance with claims 1 and the following, characterized by a portable running disc (21) as support for the tumbling disc (1) with means for drift limitation of the fixed point (3), for instance a running trough (23) with a border boss (24) a flexible and rotatable connection (25) between pivots (4) und running disc (21) or a rigid bolt (31) respectively which is capable of penetrating into an opening (34) of the pivot (4).
9. Device in accordance with claim 8, characterized by means for one-sided or universal height adjustment of the support disc, such as,

for instance, telescopic feet (38 or 44 respectively) with thread or rack gear, inclinable support struts (56) with a contact point that is adjustable by a row of holes (57), or support wedges (58) that can be fixed in various positions, or similar.

10. Device in accordance with claim 9, characterized by height-adjustable means of support (39 – 41, 46 – 49) for the constantly horizontal center line of the support disc (21).

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Abb. 1

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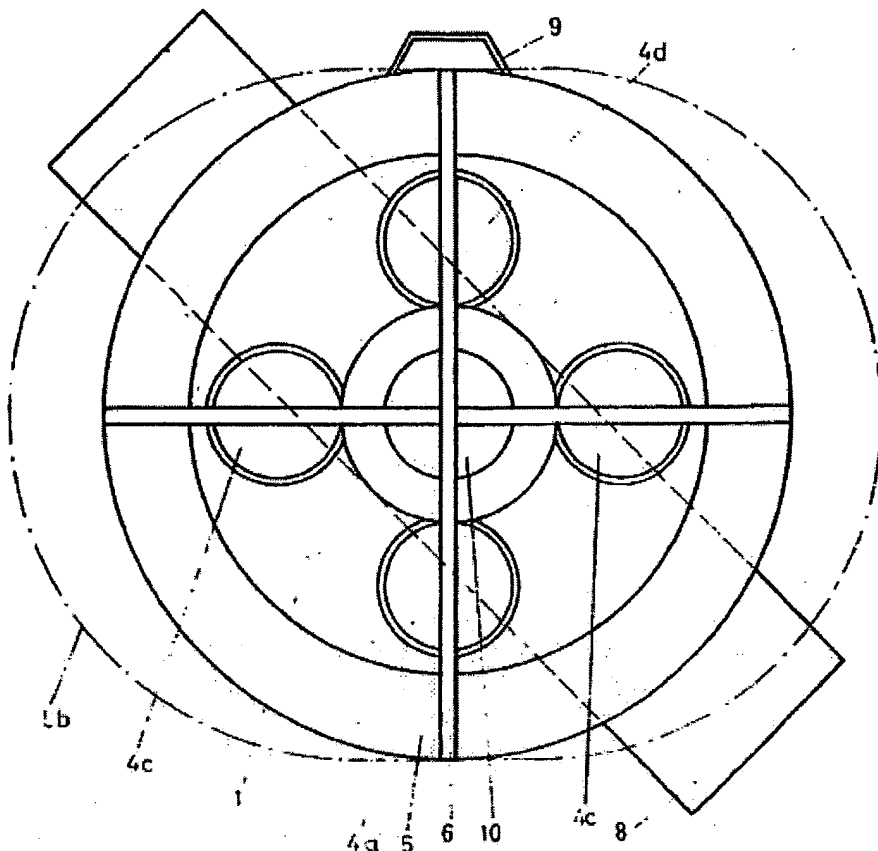
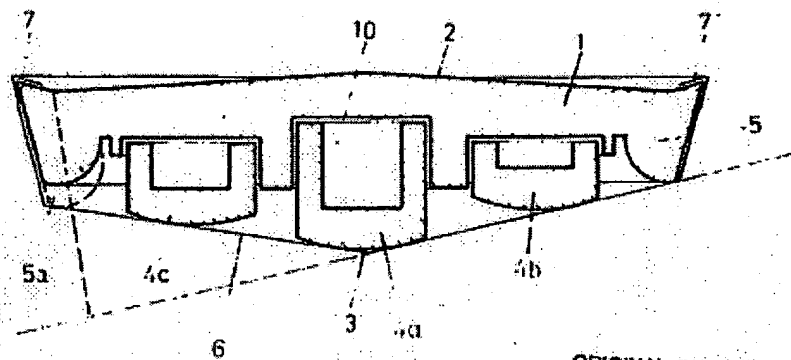


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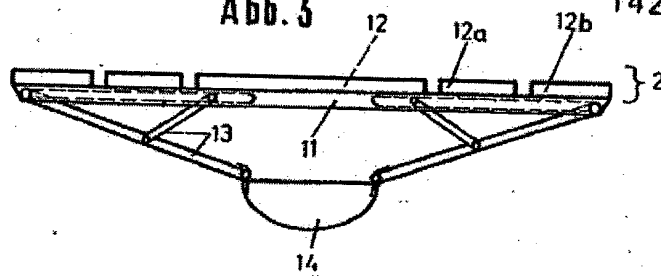


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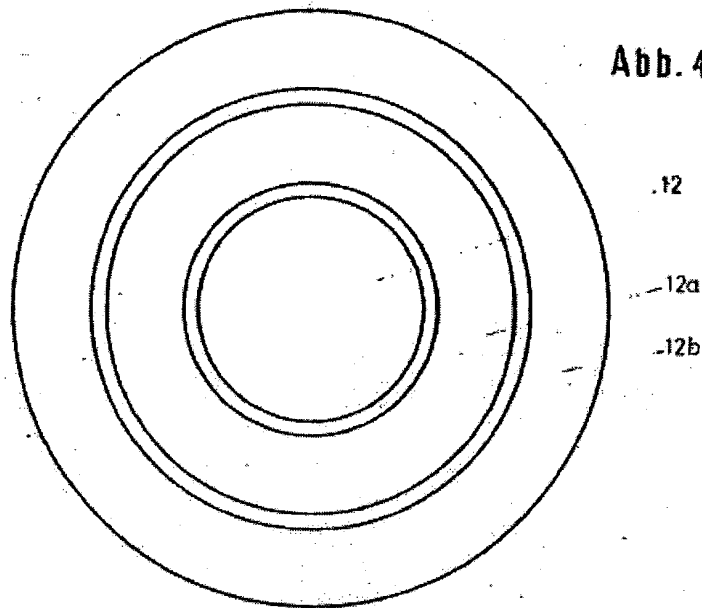
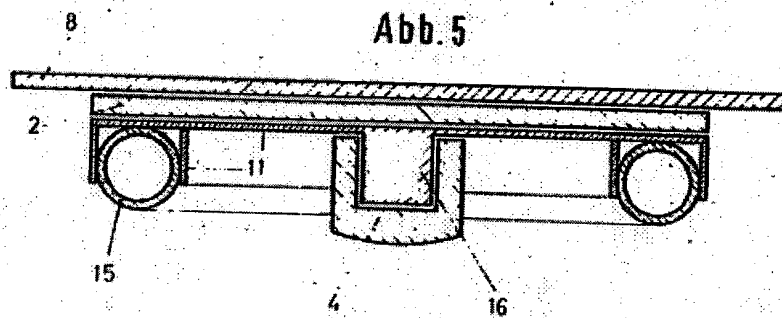


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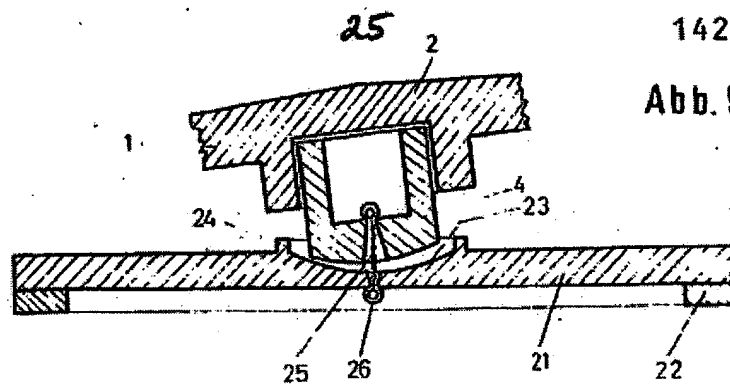


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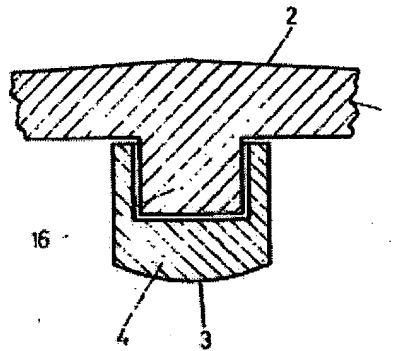


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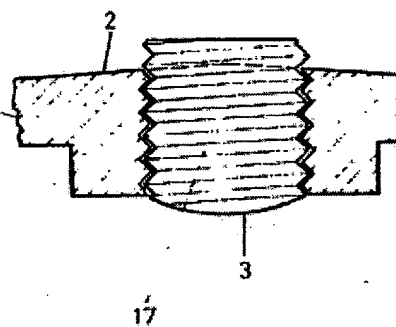


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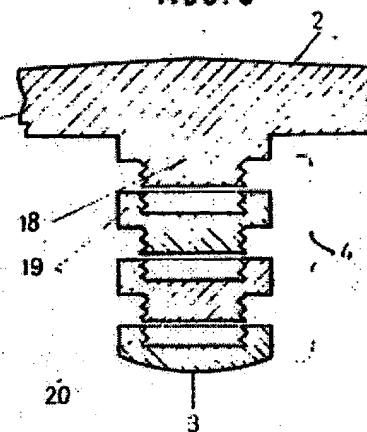
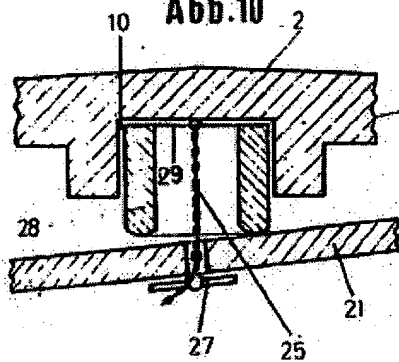


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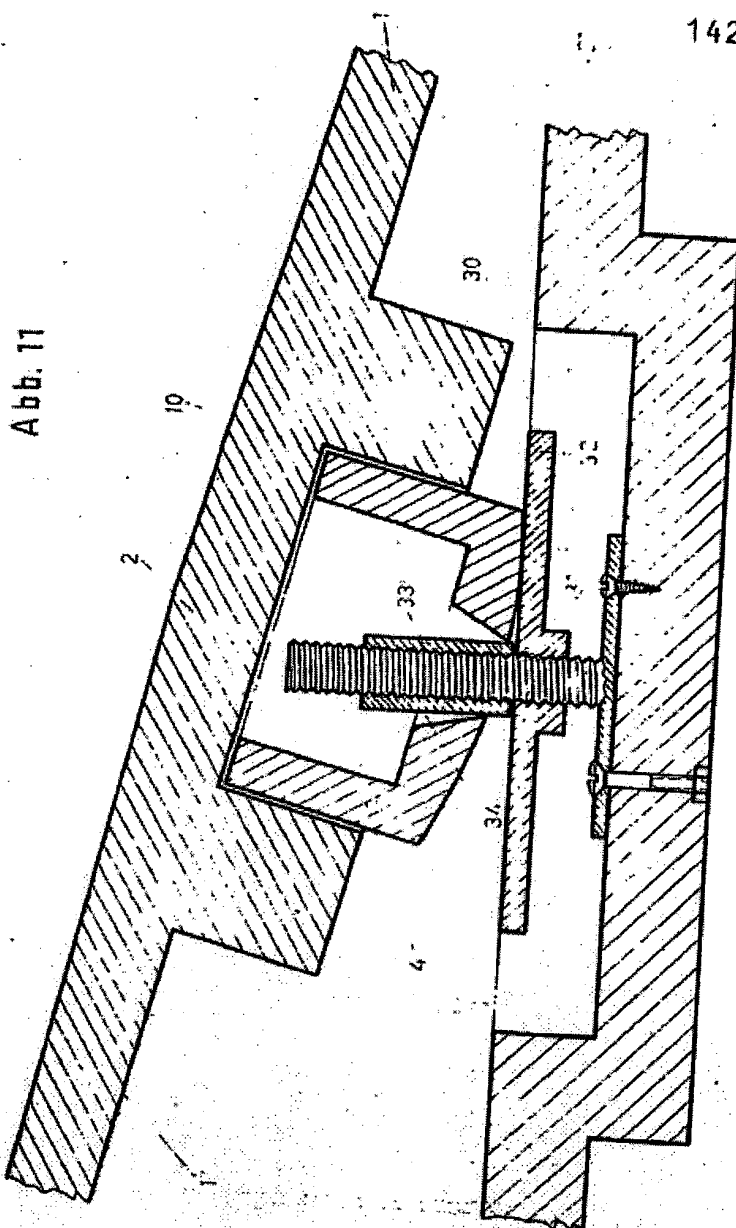


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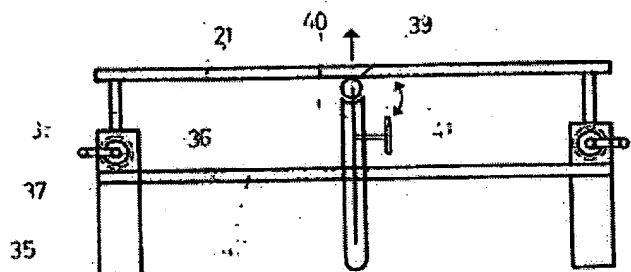
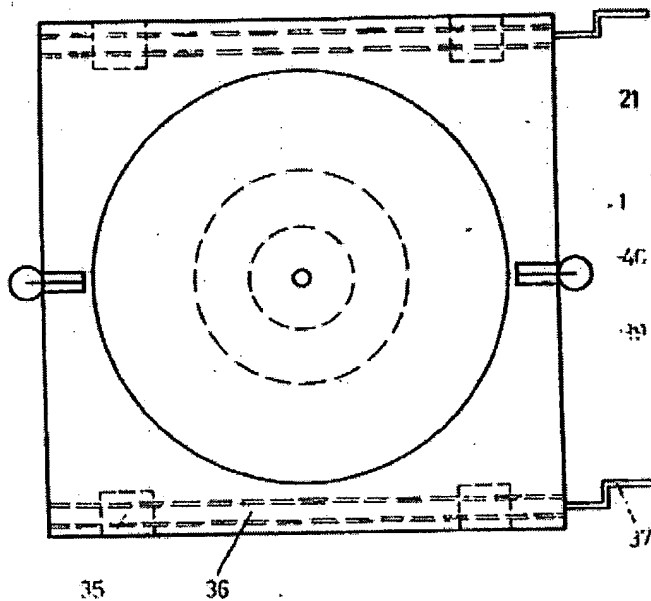


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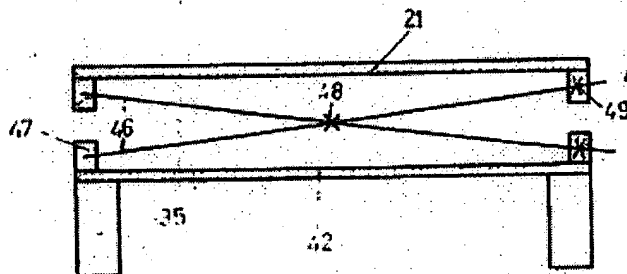


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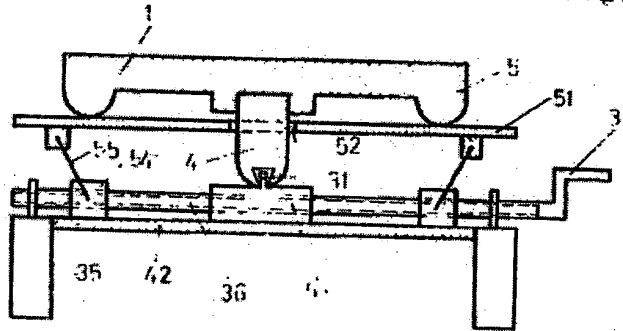


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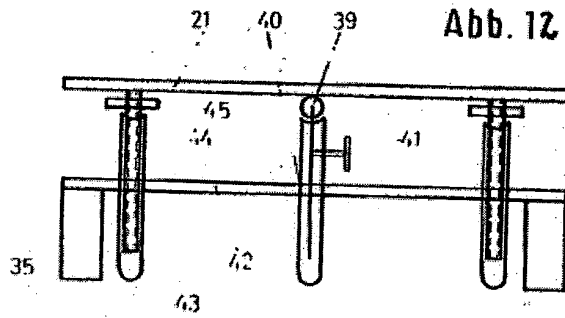
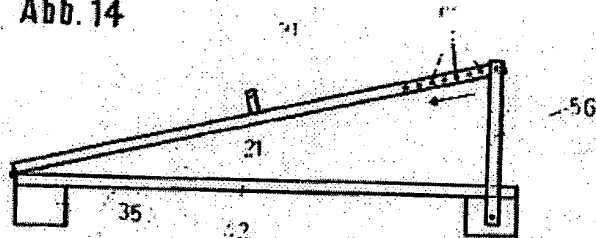


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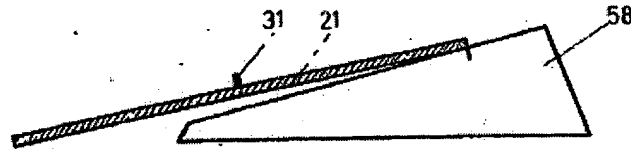


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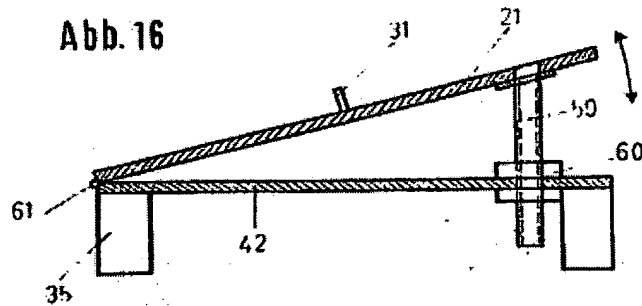


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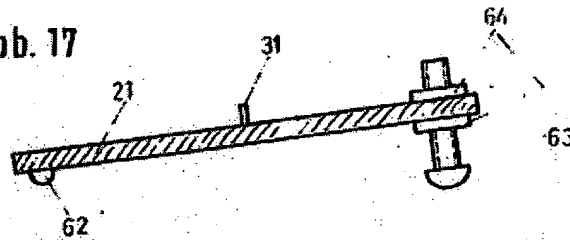
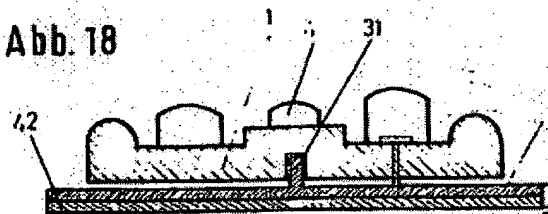


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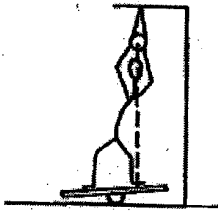


Abb. 20

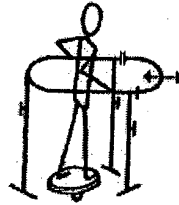
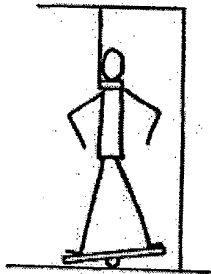


Abb. 21



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